**EPA/ROD/R04-93/131**
**1993**

# EPA Superfund
# Record of Decision:

**MATHIS BROTHERS LANDFILL (SOUTH MARBLE TOP ROAD)**
**EPA ID: GAD980838619**
**OU 01**
**KENSINGTON, GA**
**03/24/1993**

## DECLARATION of the RECORD OF DECISION

### SITE NAME AND LOCATION

Mathis Brothers - South Marble Top Road Landfill Site
Walker County, Georgia

### STATEMENT OF BASIS AND PURPOSE

This decision document (Record of Decision) presents the selected remedial action for the Mathis Brothers - South Marble Top Road Landfill site, Walker County, Georgia, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. Section 9601 et seq., and to the extent practicable, the National Contingency Plan (NCP) 40 CFR Part 300.

This decision is based on the administrative record for the Mathis Brothers - South Marble Top Road Landfill site.

The State of Georgia has concurred on the selected remedy (AppendixB).

### ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare or the environment.

### DESCRIPTION OF SELECTED REMEDY

At this time the remedial action is proposed as both the first, and the final remedial action for the site.  The function of this remedy is to treat contamination and reduce it to health based levels.  Source material and contaminated soils are the principal threat at the site.

The major components of the selected remedy include:

- Diversion of surface water;
- Excavation of waste and soil (analysis of carpet and latex waste for determination of appropriate disposal options);
- On-site incineration and disposal of chemical wastes and associated contaminated landfill soil;
- Treatability Studies to determine the effectiveness of biodegradation (an innovative technology with which microorganisms are used to break down contaminants) of contaminated subsurface soil; if successful, implementation of biodegradation with on-site disposal of treated soil;
- A RCRA Solid Waste clay cap would be placed over treated material;
- Installation of interceptor trench for groundwater collection with on-site storage and off-site treatment and disposal;
- Combined institutional control activities.
- If biodegradation is unsuccessful in treating contaminated subsurface soils EPA will consider other remedial alternatives and amend the ROD if necessary.

**STATUTORY DETERMINATIONS**

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technology to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because the remedy will not result in hazardous substances remaining on-site above health-based levels, the five-year review will not apply to this action.

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**Walker County, Georgia**

Prepared by:
U.S. Environmental Protection Agency
Region IV
Atlanta, Georgia

**RECORD OF DECISION**

The Decision Summary
Mathis Brothers - South Marble Top Road Landfill Site

## 1.0 Site Name, Location, and Description

The Mathis Brothers - South Marble Top Road Landfill Superfund Site ("Site") is located approximately 0.6 mile south of Highway 136 and 0.2 mile east of South Marble Top Road in Walker County, Georgia. The Site consists of 10 acres of undeveloped, forested land. Approximately 1.25 acres of this land had been cleared for the past landfill operation. General land use surrounding the Site is agricultural and residential. The nearest residence is located approximately 400 feet southwest of the Site (Figures 1 and 2). Drainage valleys are present to the north and south of the site, each containing an intermittent stream during prolonged rainfall events. Vegetation is present over the once-cleared portions of the site and includes various grasses and pine trees.

## 2.0 Site History and Enforcement Activities

The Site was operated by Messrs. Sidney and Mose Mathis as a landfill from approximately January 1974 to January 1980. The landfill configuration includes three disposal areas (Areas A, B, and C on Figure 2) which are estimated to be fifteen feet deep. Wastes disposed of at the Site include benzonitrile, dicamba, 1,4-dichlorobenzene, latex and carpet wastes.

In February 1974, a milky discoloration was observed on the ground near the northeast portion of the landfill. On February 26, 1974, the State of Georgia's Environmental Protection Division (EPD) notified the Mathis Brothers to stop accepting latex wastes and industrial solid wastes, including benzonitrile and dicamba. Following further site assessment by EPD in March 1974, the landfill was allowed to accept non-hazardous waste. A solid waste handling permit was granted to the Mathis Brothers by EPD in September 1975.

During an EPD inspection in January 1980, an area of distressed vegetation was observed near the northwest portion of the landfill. In early February 1980, the EPD made a determination that the landfill did not conform to the pending statutory requirements of the Resource Conservation and Recovery Act of 1976 (RCRA) and Georgia's Hazardous Waste Management Act and closed the landfill. On March 11, 1980, EPD officials met with Mr. Mose Mathis to discuss the closure requirements for the landfill.

During an EPD inspection of the landfill on April 6, 1983, it was noted that although the operations had ceased, the landfill was not properly closed in accordance with RCRA requirements. Landfill wastes were observed without the required soil cover. On April 7, 1983, EPD notified Mr. Mose Mathis that closure improvements must be made to the landfill to bring the Site into compliance with the permit. In December 1983, EPD conducted an inspection of the Site and noted that the main landfill areas had been covered with a one to two foot layer of soil. A thirty foot diameter disposal pit (area C) was left uncovered by the Mathis Brothers.

In January 1984, the EPD requested that the Site be included on the Georgia State Superfund Program listing. In June 1984, the Environmental Protection Agency (EPA) conducted a preliminary assessment of the landfill site for possible inclusion on the National Priority List (NPL). The NPL comprises hazardous waste sites which appear to present a significant threat to human health or the environment. Sites are placed on the NPL if they have a ranking score of 28.50 or greater. The Marble Top Road Site was proposed for the NPL in January 1987 and was listed on the NPL in 1989.

In December 1987, the EPA contacted several companies and/or individuals with potential responsibility for the waste disposal at the site to provide the companies and/or individuals the opportunity to conduct, with EPA's oversight, the Remedial Investigation (RI) and Feasibility Study (FS). Of the companies and/or individuals notified, one company, Velsicol Chemical Company, entered into an Administrative Order on Consent (AOC) for the performance of the RI/FS. The effective date of the AOC was November 2, 1988.

The investigation of the Site was conducted in two phases. Phase I of the RI was initiated in May 1990. Phase II of the RI was completed in July 1991. The final RI Report was accepted by EPA in July 1992. Velsicol submitted a draft FS report in February 1992; EPA revised and finalized it by July 1992.

EPA will continue its enforcement activities and will send a Special Notice Letter to those identified as potentially responsible for the contamination at the Site. This will provide the potentially responsible parties (PRPs) an opportunity to design and implement the selected remedy. Should the PRPs decline to conduct future remedial activities, EPA will either take additional enforcement actions or provide funding for these activities while seeking cost recovery for all EPA-funded response actions at the Marble Top Road Site.

## 3.0 Highlights of Community Participation

A Community Relations Plan was prepared by EPA in March 1991 as required by CERCLA 113 (k)(2)(B)(i-v) and 117. During that same month EPA met with representatives from a local environmental group and county officials to discuss the status of the investigation at the Site. EPA also printed and distributed a fact sheet describing the activities to be conducted during the RI and FS. On November 17, 1991, EPA met with a second environmental group to address concerns they had regarding the Site. The community has remained interested and active throughout the study.

The RI Report was made available to the public in February, 1992. The FS Report and the Proposed Plan for the South Marble Top Road Site were released to the public on July 30, 1992. The administrative record, which contains documents relating to the remedy selection at the site, including the RI/FS Reports and the Proposed Plan, was made available to the public at the Region IV EPA Office in Atlanta, Georgia and the Lafayette-Walker Public Library. The notice of availability of the administrative record was published in the Walker County Messenger and the Chattanooga News Free Press on July 29 and August 4, 1992. A public comment period was held from July 30, 1992 to August 29, 1992 and was extended to September 28, 1992 pursuant to a request by Velsicol Chemical Company. In addition, a public meeting was held on August 6, 1992 at the Cassandra Baptist Church, West Cove Road, Kensington, Georgia. At this meeting, representatives from EPA and EPD answered questions about the Site and the proposed plan for cleanup. A response to the comments received during the meeting as well as those received during the comment period is included in the Responsiveness Summary, which is part of this Record of Decision (ROD) (Appendix A). This decision document presents the selected remedy for the South Marble Top Road Site in Walker County, Georgia, chosen in accordance with CERCLA, as amended by SARA, and in accordance with the NCP. The decision for the Site is based on the administrative record.

**4.0 Scope and Role of Remedial Action**

This is the first and final planned remedial action for the South Marble Top Road Site. This ROD addresses the source of contamination including landfill wastes from the small, industrial, four acre landfill, as well as site media contaminated by the landfill material. The drummed waste present in the landfill and the soil contaminated with numerous organic and inorganic compounds pose the principal threat to human health and the environment because of the risks associated with possible ingestion or dermal contact. Also, the shallow groundwater present beneath the Site has been determined to contain hazardous substances similar to those present in the drummed landfill waste and contaminated soil. Although this water bearing zone is not a current source of drinking water, local residents have relied on this unit for water in the past; therefore, under future use scenarios, the contaminants in the groundwater are a principal threat to human health. The purpose of this response is to prevent current or future exposure to the landfill waste, including the associated contaminated soil and the contaminated groundwater, through treatment and reduction of the migration of contaminants.

**5.0 Summary of Site Characteristics**

5.1 Geology

The South Marble Top Road Site is located in the Valley and Ridge Province of the southeastern United States. The Valley and Ridge Province is underlain by folded consolidated sedimentary rocks ranging in age from Cambrian through Pennsylvanian. The underlying rocks include shale, dolomite, limestone, sandstone, and chert. As shown on Figure 3, several geologic formations outcrop between Lookout Mountain and Pigeon Mountain. Within the McLemore Anticline, weathered clays of the Knox Formation outcrop on the surface. The South Marble Top Road Site is situated on the residual clay cover of the Knox Formation.

The residual cover beneath the site consists of cherty clays from the decomposition of limestone and dolomite. Based on drilling activities during the investigation of the Site, the cherty clays are comprised of approximately 200 feet of clay with beds of intermixed fractured chert. The permeability of the residual cover ranges from 6.63 x 10-5 to 5.73 x 10-9 cm/sec.

5.2 Hydrogeology

Two water bearing zones are present beneath the Site: The surficial aquifer which occurs throughout the residual cherty clay and the Knox bedrock aquifer. The upper water bearing zone consists of groundwater within the fractured chert layers and clay layers and is a lower yielding zone than the Knox bedrock aquifer. These chert layers are surrounded by the clay residuum. The surficial aquifer is a Class IIB groundwater system as defined in the "Guidelines for Groundwater Classification" under the EPA Groundwater Protection Strategy, Office of Groundwater Protection, December, 1986, final draft document. The second and more predominant aquifer system, known as the Knox bedrock aquifer, is present in the Knox Dolomite Formation which is located approximately 200 feet beneath the surface of the Site.

The fractured chert layers, found in the residuum, vary in thickness from a few inches to several feet and are laterally discontinuous across the Site. As shown in Figure 4, these chert layers receive water from percolation of soil. Chert layers which outcrop at the ground surface and produce seeps, provide for lateral groundwater migration.

Vertical migration of groundwater occurs through fractures in the clay residuum and along the surfaces of the chert fragments. Tritium age dating of groundwater throughout the surficial water bearing zone indicates groundwater recharge has occurred in the residuum since the 1950's and is approaching the underlying Knox bedrock aquifer.

The Knox bedrock aquifer is a cavernous dolomite and limestone that is highly fractured. Wells were completed in the Knox formation at the site in June of 1992. The results of sampling these wells indicate that the contamination has not migrated beyond the site boundaries nor has the contamination impacted the deeper underlying Knox Bedrock Aquifer. If future groundwater monitoring indicates contamination in the Knox Aquifer, EPA will address this in a future decision document. Water wells within a one mile radius of the Site are completed in the bedrock aquifer. The average yield for wells in this aquifer is 200 - 300 gallons per minute (gpm). Beneath the Site, the McLemore Anticline forms a groundwater divide within the Knox bedrock aquifer, thus depending on the side of the anticline, groundwater movement is in a southeast or southwest direction.

### 5.3 Surface Water

The topography of the Site is characterized by elevated knolls, with moderate slopes that yield surface water during rainfall events. Drainage valleys are present to the south and north of the Site. These valleys allow surface runoff to drain into an intermittent tributary of Mill Creek. Mill Creek eventually discharges into West Chickamauga Creek.

During periods of high precipitation, seeps have been identified north and east of the Site. The seeps are present where beds of fractured chert outcrop, thus allowing shallow groundwater to exit onto the surface.

### 5.4 Sampling Results

The primary emphasis for analytical testing during the RI was placed on determining the impact that the three disposal areas within the South Marble Top Road Site may have had on the environment at the Site, including the effect on soil, surface water, sediment, air and groundwater. In addition to sampling the environmental media at the Site, samples were collected from the drummed material within the landfill. Based on all media sampled and analyzed, a total of twenty six (26) volatile organic compounds, twenty five (25), semi-volatile organic compounds, eleven (11) pesticides, four (4) herbicides, and twenty one (21) inorganic compounds have been identified at least once throughout the analytical process at the Site.

#### 5.4.1 Drum Sampling

The contents of four drums from Disposal Area A, two drums from Disposal Area B, and one drum from Disposal Area C were sampled (see Figure 5). The drums had been placed in a random orientation during disposal and showed signs of structural damage and corrosion. A total of nine (9) volatile organic compounds, sixteen (16) semi-volatile organic compounds and two (2) herbicides were detected in the drums at levels which exceed background soil concentrations. The main constituents present in the drums are dicamba, benzonitrile and 1,4-dichlorobenzene. A summary of the sampling results is provided on Table 1.

A total of 12,000 drums (3,100 $yds^3$) are estimated to have been disposed of in the landfill. In addition to the drummed material, carpet scraps and latex wastes were observed in the landfill. Based on historic records, the depth of the disposal area is estimated to be 10-15 feet and the total volume of the landfill is estimated at 25,000 $yds^3$. These wastes comprise the principal threat at the site.

### 5.4.2 Surface Soil

Thirty-seven surficial soil samples were collected from the site during the RI. Surface soil samples were collected from 0 to 2 ft below the ground surface. The results of this sampling effort indicate contaminants are generally present north of the landfill (Figure 6). Surface soil samples which exhibit the highest number of compounds and concentrations are located within the drainage paths of seeps north of the landfill. A total of eight (8) volatile organic compounds, five (5) semi-volatile organic compounds, one (1) herbicide, one (1) pesticide, and fifteen (15) inorganic compounds were detected in the surface soil at levels which exceed background surface soil conditions. A summary of the surface soil sampling is provided on Table 2.

### 5.4.3 Subsurface Soil

Seventy-eight (78) subsurface soil samples were collected to depths of forty (40) feet and a total of fifteen (15) subsurface soil samples were collected from a depth between forty (40) and 92 feet. Based on the analytical results, subsurface soil contamination was identified in soil primarily around the landfill at depths less than 100 feet (Figures 7 and 8). A total of eleven (11) volatile organic compounds, nine (9) semi-volatile organic compounds, two (2) herbicides, five (5) pesticides, and nineteen (19) inorganic compounds were detected in subsurface soil at levels which exceed background levels. A summary of the subsurface soil sampling is provided on Table 3. The total estimated volume of subsurface soil contamination is 97,700 $yds^3$.

### 5.4.4 Groundwater

A total of twenty-one (21) monitoring wells were installed for the collection of shallow groundwater. Five (5) wells were installed adjacent to the landfill boundary during the initial phase of the RI. An additional sixteen (16) wells were installed during subsequent RI field activity to define the extent of contamination. The wells were installed with well screens set between 25 and 90 feet below the surface of the ground. Concentrations of groundwater contamination are greatest surrounding the landfill. The highest concentrations of groundwater contamination were found in the northeast portion of the Site (Figure 9). A total of fourteen (14) volatile organic compounds, eleven (11) semi-volatile organic compounds, nine (9) pesticides, two (2) herbicides, and seventeen (17) inorganic compounds were identified in the groundwater. Table 4 provides a summary of the groundwater sampling conducted during both phases of the RI. Approximately 1,500,000 gallons of shallow groundwater are contaminated at the Site.

### 5.4.5 Surface Water and Sediment

Surface water and sediment samples were collected to assess contamination and potential contribution of contaminants into the surface water system. Surface water features at the Site consist of rainfall runoff, seeps, drainage valleys, and standing water. Thirteen surface water samples and sixteen (16) sediment samples were collected at the Site. The data from this sampling indicate that contaminants are being released north of the landfill from seepage of leachate and surface runoff. In addition, surface water contamination is present in the remnant pit located in Disposal Area C and sediment contamination has been observed in the drainage valley north of the Site. Six (6) volatile organic compounds, six (6) semi-volatile organic compounds, three (3) pesticides, two (2) herbicides, and ten (10) inorganic compounds were present in the surface water at the site. Eight (8) volatile organic compounds, three (3) semi-volatile organic compounds, one (1) herbicide, and sixteen (16) inorganic compounds were detected in the sediment at the site. A summary of the sampling data is available in Table 5.

#### 5.4.6 Air

Air samples were collected as part of the RI to assess the potential airborne migration of contamination at the Site. Samples were collected upwind and downwind of the Site as well as on-site during excavation of landfill material. The results of air sampling do not indicate that air transport of contaminants is occurring.

## 6.0 Summary of Site Risks

CERCLA directs that the EPA must protect human health and the environment from current and potential exposure to hazardous substances at Superfund sites. The assessment of risk posed by the South Marble Top Road Site was evaluated in a site specific risk assessment dated January 1992.

### 6.1 Identification of Contaminants of Concern

The South Marble Top Road Landfill Site is a threat to human health and the environment due to the presence of hazardous substances in the landfill. The criteria for selection of contaminants of concern include the frequency of detection, the number of media affected, the concentration of a contaminant, the toxicity of the contaminant, and whether the contaminant is known to be associated with past disposal practices. The contaminants of concern for the Site are listed in Table 6.

### 6.2 Exposure Assessment Summary

Exposure assessment is the estimation of the magnitude, frequency, duration, and routes of exposure to humans. Exposure to the contaminants of concern at the Site was evaluated based on current and future use scenarios. The principal potential pathways of exposure for the Site are direct contact with the contaminated landfill material, soils or sediment and/or consumption of contaminated groundwater.

The Site is currently closed to the public; therefore, the current land use for the Site would be limited to occasional trespassers. The average and maximum exposure frequency for a trespasser was estimated at 25 and 50 visits per year, respectively. For the trespasser scenario, the exposure pathways are ingestion and dermal contact with contaminants in the soil and dermal contact with surface water. Since the population surrounding the Site are served by a municipal water system, ingestion of the contaminated groundwater was not evaluated as a potential pathway of current exposure.

To address future use scenarios, it was assumed that residential development would occur at the Site. Daily exposure was estimated at an average duration of nine (9) years for adults and seven (7) years for children and a maximum duration of 30 years for adults. In conducting the exposure assessment for the residential use scenario, focus was on the health effects that could result from inhalation of particulate phase contaminants, ingestion and dermal contact with contaminated soil, dermal contact with surface water and seeps, and ingestion and dermal contact with contaminated groundwater.

### 6.3 Toxicity Assessment Summary

Toxicity values are used in conjunction with the results of the exposure assessment to characterize site risk. Cancer potency factors (CPFs) have been developed by EPA for estimating excess lifetime cancer risks associated with exposure to carcinogenic chemicals. Reference doses (RfDs) have been developed for indicating the potential for adverse health effects due to exposure to noncarcinogenic chemicals.

CPFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. The CPFs, which are expressed in units of (mg/kg-day)[-1], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the cancer risk. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this conservative approach makes underestimation of the actual cancer risk highly unlikely. The CPFs for inhalation and oral exposure to the contaminants of concern at the Site are contained in Table 7.

RfDs are also based on the results of human epidemiological studies or animal studies to which uncertainty factors have been applied to account for the use of animal studies to predict noncarcinogenic effects on humans. RfDs, expressed in units of mg/kg-day, are estimates of chronic daily human exposure levels which are not expected to cause adverse effects. Estimated intakes of chemicals from environmental media can be compared to the RfD. Uncertainty factors are applied to the RfDs to insure an underestimation of the potential for adverse noncarcinogenic effects does not occur. The RfDs for this Site are provided in Table 8.

## 6.4 Risk Characterization Summary

A characterization of risk was performed in the risk assessment to estimate the carcinogenic risk and the noncarcinogenic health effects posed by the South Marble Top Road Landfill Site. The risk characterization was based on identifying potential chemicals of concern and developing exposure scenarios for current and future exposure pathways.

Excess lifetime cancer risks are determined by combining the results of the exposure and toxicity assessments. Carcinogenic risk is a probability that is generally expressed in scientific notation (e.g., 1x10[-6]). An excess cancer risk of 1x10[-6] indicates that an individual has a one in one million additional chance of developing cancer as a result of site-related exposure to a specific carcinogen over a 70-year lifetime under the specific exposure conditions at the Site. EPA has established an acceptable range of 1x10[-6] to 1x10[-4] for individual lifetime excess cancer risk.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. An HI which exceeds unity indicates that there may be concern for potential health effects resulting from exposure to the contaminant.

The risk assessment process contains inherent uncertainties. Exposure parameters such as frequency and duration of exposure and ingestion rate of contaminated media can vary between individuals. Therefore, upperbound values were used to estimate exposure, in order to be more protective of human health. Slope factors and Reference Doses each involve extrapolation to which conservative uncertainty factors are added in order to be protective of sensitive humans. Thus, the risk characterization process strives to minimize the probability that uncertainties may result in an underestimation of the actual health risks that could result from human exposure to the site.

For the current use scenario (trespasser), the total lifetime cancer risks associated with exposure to the Site is 4x10[-8] under mean exposure conditions and 2x10[-7] under the reasonable maximum exposure scenario (RME). The total HI for exposure to noncarcinogens was calculated to be 1.82x10[-3] (mean) and 1.47x10[-2] (RME). Since the carcinogenic risks are less than the EPA's established risk range (1x10[-4] to 1x10[-6]) and the hazard indices are less than one, the current exposure pathways are not producing unacceptable risks or health effects.

For the future use scenario (residential), the total lifetime cancer risks for adults is 2x10[-5] (mean) and 3x10[-4] (RME). The chemicals that primarily contributed to this risk are benzene, bis (2-ethylhexyl) phthalate, 2,6 dinitrotoluene and 1,4-dichlorobenzene. For a child resident, the mean risk is 3x10[-5] and the RME is 2x10[-4] with the primary contributors being benzene, bis (2 ethylhexyl) phthalate and 2,6 dinitrotoluene. The total HI for adult residents was calculated to be 0.753 (mean) and 7.12 (RME). The chemicals that primarily contributed to the risk associated with dermal contact with groundwater include ethyl benzene, toluene and vanadium. For groundwater ingestion the primary contributors were toluene, benzoic acid, benzonitrile, bis (2-ethylhexyl) phthalate, 1,2,4-trichlorobenzene, 2,4-D, chromium VI, silver and vanadium. The total HI for children which would reside at the site under the future use scenario is 1.72 (mean) and 14.1 (RME). The chemicals that primarily contributed to risk associated with dermal contact with groundwater include toluene and vanadium. For groundwater ingestion the primary contributors were toluene, benzoic acid, benzonitrile, bis (2-ethylhexyl) phthalate,1,2,4 trichlorobenzene, 2,4-D, chromium VI, silver, and vanadium. As indicated by the carcinogenic risks and noncarcinogenic hazard indices, the future use residential scenario exceeds the EPA's risk range and hazard index.

## 6.5 Environmental Risk Summary

During the RI, no endangered or threatened species were observed at the Site. Although the Site is fenced, it is still accessible to terrestrial species such as mice, rabbits, birds, etc.; therefore, a potential exists that wildlife may have direct contact with contaminants at the Site. The maximum exposure condition was assumed to be associated with burrowing activities of rodents living on the Site. The results of the ecological risk assessment indicate a hazard index of 494 (mean) and 1612 (RME). Since these hazard indices exceed EPA's accepted level of 10 for environmental risk, burrowing species may suffer adverse effects from the contaminants present at the Site.

Minnows and tadpoles have been observed in the remnant pit on the Site. Surface water present in this pit exceeds Ambient Water Quality Criteria as well as Region IV Water Screening Criteria for several contaminants (Table 9); therefore, the water in the pit poses potential risk to aquatic life.

Table 9: Comparison of Ambient Water Quality Criteria With Maximum Concentrations of The Chemicals That Exceed AWQC in Surface Water

## 6.6 Cleanup Levels

Cleanup levels, designed to protect human health and the environment from threats posed by the hazardous substances present at the Site, were developed for soil, sediment, surface water and groundwater. See Table 10 and Table 11. The model that was used to calculate the soil clean-up levels is a direct leaching model. The direct leaching model is expressed as AL = (foc) (Koc) (HBN) where AL is soil action level, foc is the fraction organic carbon, Koc is the organic carbon water partition coefficient and HBN is a health based number for the protection of groundwater such as an MCL. This model was used because the contaminated soils are near the water table and there is little chance for attenuation plus much of the ground water transport is through fractured chert which again affords little opportunity for attenuation.

The proposed plan did not contain soil cleanup levels for metals. It stated that soil cleanup values for metals would be included in the ROD as soon as they were determined. Since the time that the proposed plan was issued EPA determined that there is no statistical difference between the metals levels found in background soil and those found in site soil samples. Therefore, there is no need for soil cleanup levels for metals in soils.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

**7.0 Description of Alternatives**

Five alternatives were considered for remediation of the contaminated soil and groundwater at the South Marble Top Road Site. The alternatives are evaluated in detail in the Feasibility Study Report. All of the alternatives, except the "No Action" alternative, address contamination in excess of the cleanup levels established for the Site.

7.1 Alternative 1 - No Action

The Superfund program requires the "No Action" alternative be considered at every site [Section 300.430 (e) of the National Contingency Plan]. The no action alternative serves as a baseline with which the other alternatives can be compared. Under the no action alternative, EPA would take no action at the Site to control or minimize the migration of the contaminants in either the soil or groundwater. There is no cost associated with this alternative since no additional activities would be conducted.

Capital Cost: -0-
Annual Operation and Maintenance (O&M) Costs: -0-
Present Worth (PW): -0-
Months to Implement: -0-

7.2 Alternative 2 - Institutional Controls

Combined institutional controls on the site would include physical limitations to on-site access (fencing and signing) and deed restrictions on land use and bans on use of shallow groundwater on site and nearby. Surface and groundwater would be monitored for at least 30 years, biannually for the first five years and annually thereafter. EPA would conduct five-year reviews. This option also includes four new monitoring wells and surface water controls.

Capital Cost: $221,400
Annual O&M Costs: $358,500
PW: $580,000
Months to Implement: 24 months

7.3 Alternative 3 - Resource Conservation and Recovery Act (RCRA Subtitle C) Multilayer Cap and Interceptor Trench/Off-Site Treatment/Disposal

Alternative 3 proposes that a RCRA multilayer cap and an interceptor trench be constructed over and around the existing landfill, respectively, to impede the infiltration of precipitation and to provide a collection system for contaminated groundwater. The cap would cover an area of about four (4) acres. The trench would extend to a depth of approximately 40 feet below grade, encircling the landfill along a perimeter of about 1,680 linear feet. Initial construction would consist of clearing the land and grading the site to facilitate building the interceptor trench.

Groundwater would be pumped from the trench to an on-site steel tank and transported off site to a regulated facility for treatment and disposal. Each batch will be tested to determine whether it meets cleanup levels. If, when tested, each batch could meet cleanup levels and Federal and State requirements (ARARs), it would be discharged on site.

This also includes all of the activities contained in the previous alternative.

Capital Cost: $2,100,000
Annual O&M Costs: $1,300,000
PW: $3,400,000
Months to Implement: 24 months

7.4 Alternative 4 - On-Site Incineration/Disposal, RCRA Multilayer Cap and Interceptor Trench/Off-Site Treatment/Disposal

The basic components of Alternative 4 include collection, off-site treatment and disposal of groundwater, remediation of landfill waste and associated soil, and capping.

This alternative includes the interceptor trench for collection and containment of groundwater discussed in Alternative 3. As in Alternative 3, the ground and surface water will be stored on-site in a steel storage tank and will be sent off-site for treatment and disposal. This management and disposal will continue until the water on-site meets cleanup levels and ARARs.

Alternative 4 requires excavating and testing the various landfill wastes to determine the appropriate disposal or treatment options of the landfill waste and associated soils and to determine whether it contains a hazardous substance or has the potential to release hazardous substances. Any of the landfill waste which contains hazardous substances or has the potential to release hazardous substances will be removed and incinerated on-site. Associated soils, i.e. soils which cannot be separated from these wastes, will also be incinerated. However, if the only hazardous substances found in the carpet wastes are metals, those wastes will be disposed of properly in a RCRA Subtitle C landfill off-site, instead of incinerated. All other site soils and any landfill wastes that either do not contain hazardous substances or do not have the potential to release hazardous substances, will remain undisturbed and will be covered by the cap discussed below.

The wastes found thus far at the site are considered characteristic hazardous waste. When this material is incinerated and no longer exhibits the characteristic that caused it to be a hazardous waste then it is no longer a hazardous waste. Treated waste which is no longer a hazardous waste will be placed back in the ground on-site. If, however, the treated waste still contains metals and fails TCLP then it is a hazardous waste and must be disposed of in a Subtitle C landfill. All waste and associated soils that are excavated from the landfill must meet applicable RCRA Land Disposal Restriction treatment standards before the treated waste (e.g. incinerator ash) can be placed back on the ground or sent off-site for landfill disposal.

The NCP establishes a presumption that treatment to the legislated standards based on the Best Demonstrated Available Technology is generally inappropriate for CERCLA contaminated soil and debris (55 FR 8758-62, (March 8, 1990)). Therefore, compliance with the land disposal treatment standards would be achieved pursuant to a treatability variance for CERCLA contaminated soil and debris which would be granted upon ROD signature.

Finally, this alternative requires a RCRA multilayer cap to contain treated landfill waste (such as ash and incinerator waste), other nonhazardous landfill wastes and remaining subsurface soils [contaminated at levels above soil action (cleanup) levels (SALs)]. However, any incinerator ash that will contain elevated levels of metals will be properly disposed of off-site.

Removal and treatment alternatives may require temporary relocation of residents adjacent to the site. EPA can relocate households temporarily with a minimum of inconvenience and has done so at other sites around the country. An estimated cost for temporary relocation has been included in the total estimated cost, should relocation be necessary. Alternative 4 also includes activities and institutional controls contained in Alternative 2.

Capital Cost: $8,377,000
Annual O&M Costs: $1,298,000
PW: $9,675,000
Months to Implement: 24 months

7.5 Alternative 5 - On-Site Incineration/Disposal, On-Site Biotreatment With Disposal and Interceptor Trench With Off-site Treatment/Disposal

This alternative proposes a multi-step plan for the remediation process:

- Diversion of surface water;
- Excavation of waste and soil (analysis of carpet and latex waste for determination of appropriate disposal options);
- On-site incineration and disposal of chemical wastes and associated contaminated landfill soil;
- Treatability Studies to determine the effectiveness of biodegradation (an innovative technology with which microorganisms are used to break down contaminants) of contaminated subsurface soil; if successful, implementation of biodegradation with on-site disposal of treated soil;
- A RCRA Solid Waste clay cap would be placed over treated material;
- Installation of interceptor trench for groundwater collection with on-site storage and off-site treatment and disposal;
- Combined institutional control activities.
- If biodegradation is unsuccessful in treating contaminated subsurface soils EPA will consider other remedial alternatives and amend the ROD if necessary.

The components are similar to #4 except this alternative provides for treatment of subsurface soils and use of a RCRA solid waste clay cap in lieu of a multilayer cap use. Remediation will begin with collecting run-off waters and excavating the landfill wastes and soils. An interceptor trench system will be installed to collect and remove contaminated groundwater. Waste suspected to be hazardous would be stored in a RCRA-approved storage area before treatment. Approximately 4,000 $yd^3$ of soil excavated during drum and waste removal would be incinerated on-site. About 97,700 $yd^3$ of subsurface soils underneath the landfill would be treated on-site by biodegradation if biodegradation is proven effective in treatability studies. An engineered bio-cell design would be used for biodegradation to reduce the organic contaminants through bacterial and/or fungal metabolism. With respect to the wastes and soils at this site, bioremediation has not yet been proven to be an effective technology. Contaminated site waters will be collected and stored on-site prior to treatment and discharge. If biodegradation is unsuccessful in treating contaminated subsurface soils EPA will consider other remedial alternatives and amend the ROD if necessary. Once soil action levels are achieved, the treated soils will be used to backfill the excavation. Incinerator ash will also be backfilled on-site. If the ash or treated soils still contain elevated levels of metals this material will be disposed of properly off-site. Implementation of removal and treatment alternatives may require temporary relocation of residents adjacent to the site. An estimated cost for temporary relocation has been included in the total estimated cost of this alterative also, in case relocation is necessary.

The NCP establishes a presumption that treatment to the legislated standards based on the Best Demonstrated Available Technology is generally inappropriate for CERCLA contaminated soil and debris (55 FR 8758-62, (March 8, 1990)). Therefore, compliance with the land disposal treatment standards would be achieved pursuant to a treatability variance for CERCLA contaminated soil and debris which would be granted upon ROD signature.

Capital Cost: $11,830,000
Annual O&M Costs: $1,152,000
PW: $12,980,000
Months to Implement: 36 months

**8.0 Summary of the Comparative Analysis of Alternatives**

This section of the ROD provides the basis for determining which alternative provides the best balance with respect to the statutory balancing criteria in Section 121 of CERCLA and in Section 300.430 of the NCP. The major objective of the FS was to develop, screen, and evaluate alternatives for the remediation at the Mathis Brothers South Marble Top Road Landfill Site. The remedial alternatives selected from the screening process were evaluated using the following nine evaluation criteria:

- Overall protection of human health and the environment.
- Compliance with applicable and/or relevant Federal or State public health or environmental standards.
- Long-term effectiveness and permanence.
- Reduction of toxicity, mobility, or volume of hazardous substances or contaminants.
- Short-term effectiveness, or the impacts a remedy might have on the community, workers, or the environment during the course of implementing it.
- Implementability, that is, the administrative or technical capacity to carry out the alternative.
- Cost-effectiveness considering costs for construction, operation, and maintenance of the alternative over the life of the project, including additional costs should it fail.
- Acceptance by the State.
- Acceptance by the Community.

The NCP categorizes the nine criteria into three groups:

(1) Threshold Criteria - overall protection of human health and the environment and compliance with ARARs (or invoking a waiver) are threshold criteria that must by satisfied in order for an alternative to be eligible for selection;

(2) Primary Balancing Criteria - long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability, and cost are primary balancing factors used to weigh major trade-offs among alternative hazardous waste management strategies; and

(3) Modifying Criteria - state and community acceptance are modifying criteria that are formally taken into account after public comment is received on the proposed plan and incorporated in the ROD.

The selected alternative must meet the threshold criteria and comply with all ARARs or be granted a waiver for compliance with ARARs. Any alternative that does not satisfy both of these requirements is not eligible for selection. The Primary Balancing Criteria are the technical criteria upon which the detailed analysis is primarily based. The final two criteria, known as Modifying Criteria, assess the public's and the state agency's acceptance of the alternative. Based on these final two criteria, EPA may modify the remedial action.

The following analysis is a summary of the evaluation of alternatives for remediating the Mathis Superfund Site under each of the criteria. A comparison is made between each of the alternatives for achievement of a specific criterion.

Threshold Criteria

8.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Alternative 2 is protective of human health, but it is not protective of the environment. Alternative 3 is protective of human health and the environment. Alternative 3 reduces the risk by limiting potential exposure with a RCRA cap and reducing infiltration of surface water into the landfill and by collecting contaminated shallow groundwater for treatment and disposal and eliminating off-site migration discharge of groundwater via seeps. Alternative 3 addresses protection of the environment by control of contaminated groundwater migration, however the source material (drums) remains on-site. Alternative 4 includes the components of Alternatives 2 and 3 and adds a greater degree of protection of both human health and the environment. Alternative 5, both the incineration and bioremediation, provides the greatest overall protection of human health and the environment because it provides for remediation of contaminated subsurface soils in addition to elements included in Alternative 4; the site is essentially restored to a protective condition and risks to human health and the environment are eliminated with Alternative 5.

8.2 Compliance with ARARs

Alternatives 1 and 2 do not comply with RCRA, Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and/or Georgia's Solid Waste Management Act. Alternatives 1 and 2 are not protective and do not meet ARARs therefore they will not be discussed further. Alternative 3 does not comply with management requirements for non-hazardous wastes, specifically, those applicable design and construction requirements requiring a composite basal liner. Alternative 3 also does not meet RCRA landfill requirements regarding the source at the site because although the source material is not a hazardous waste, itis similar in nature so that standards for managing RCRA hazardous waste are relevant and appropriate. Alternative 3 attains a much greater degree of compliance with ARARs than Alternatives 1 and 2, but less than Alternatives 4 and 5. While protective, Alternative 3 does not meet ARARs and will not be discussed further. Alternative 4 fully complies with ARARs associated with the various components of the alternative (removal, storage, treatment, and disposal). RCRA Land Disposal Restrictions (LDR) restricted wastes would be treated by the Best Demonstrated Available Technology (BDAT) and disposed of on-site in compliance with RCRA requirements. Alternative 4 attains a greater degree of compliance with ARARs than Alternative 3 because the landfill wastes will be removed and treated, and then disposed of on-site according to RCRA nonhazardous landfill requirements. Alternative 5, which includes bioremediation also complies with all ARARs. If it is discovered that subsurface soils are contaminated with LDR restricted wastes, bioremediation to treat these soils will require a treatability variance for soil and debris (before treated soils can be disposed of on-site). Until treatability studies have been conducted, EPA will not know whether bioremediation can achieve cleanup goals. All of the alternatives would comply with Clean Air Act (CAA) ARARs.

Primary Balancing Criteria

8.3 Long-Term Effectiveness and Permanence

Alternative 4 and 5 would achieve greater long term effectiveness and permanence through removal of the source areas. Treatment will render the wastes nonhazardous as defined by RCRA. For Alternative 5, bioremediation of subsurface soils would permanently reduce the concentration of contaminants to cleanup levels. Therefore, Alternative 5 achieves the greatest degree of long term effectiveness and permanence. Off-site treatment/disposal at a permitted RCRA treatment, storage, and disposal (TSD) facility would effectively and permanently reduce the volume of contaminated groundwater on-site.

8.4 Reduction of Toxicity, Mobility or Volume Through Treatment

The alternatives including containment (4, 5) would reduce the potential for increased waste volume and migration of contaminated soil and groundwater by minimizing the generation of leachate. Incineration (Alternatives 4 and 5) would result in a reduction of mobility, toxicity, and volume. Biological treatment (5) would result in short-term waste volume increases; however, this process would be expected to achieve ultimate waste destruction over a period of time, thus decreasing toxicity and volume to a higher decree than containment alternatives. Off-site treatment and disposal of groundwater (4 and 5) would remove the waste from the site for processing at a RCRA facility. Alternatives 4 and 5 would all reduce contaminant mobility, toxicity, and volume, although Alternative 5 would result in the greatest reduction.

8.5 Short-Term Effectiveness

The alternatives including containment (Alternative 4) would achieve almost immediate reduction on the potential for waste generation and migration. Alternatives 4 and 5 would require source area excavation and storage for processing. Consequently, the volume and/or mobility of the waste streams could increase while the excavation is open and vulnerable to weather disturbances and from air emissions. Additionally, off-site disposal could result in a temporary increase in the potential for public exposure during waste transport. Implementation of Alternatives 4 and 5 includes some form of short term exposure of Site workers. However, properly managed, these short-term concerns can be diminished significantly.

8.6 Implementability

All alternatives are implementable. Containment (Alt. 4 and 5) is a proven technology which could be easily implemented. Materials and equipment are the only requirements and are available locally.  Many of the materials are synthetic and would have to be specially ordered, but are commercially available.  Although interceptor trench construction (4 and 5) requires special equipment, it is readily available.  Containment technologies would require clearing of the land to permit safe and proper equipment operation and construction of the cap, interceptor trench, and fence. Abandonment of existing monitor wells and reinstallation of new ones could easily be accomplished.

Appropriate removal, treatment, and disposal alternatives could also be implemented at the site. Additional clearing of land would be necessary for construction of bio-cells (5) and equipment installation of bioremediation. With respect to the waste and soils at this site bioremediation is not yet a proven technology.  It will be necessary to test the various landfill waste to determine the appropriate disposal or treatment options necessary for these types of material. Treatment methods would be designed to detoxify (make less harmful) the waste and soils to required cleanup levels.  The process of remediation under these alternatives could take from one to three years to complete.  Electricity and public water supply lines are available for connection at or near the Site.  Although temporary relocation of a few residences may be necessary to implement alternatives 4 and 5, EPA can relocate households temporarily with a minimum of inconvenience and has done so at other sites around the country.

8.7  Cost

All of the costs are for construction and operation and maintenance (O&M) of each alternative. The lowest cost alternative is #1 at $0, but it is the least effective.  The other alternatives have present worth costs of $580,000, $3,400,000, $9,675,000 and $12,980,000, with #5 being the most expensive.  Modifying Criteria

8.8  State Acceptance

The State of Georgia has concurred with the selection of Alternative #5 to remediate the Mathis Site.

8.9  Community Acceptance

The public was concerned about incineration and the possibility of spreading the contamination through the air.  They were also concerned about the potential for contamination of the Knox aquifer, a drinking water source. Based on the comments received at the public meeting as well as during the public comment period, some of the community members support the selected remedy and some do not.  The community was generally in agreement that some remediation was needed to provide protection of health and the environment. The Responsiveness summary in Appendix A documents how EPA has tried to address community concerns about the proposed plan and the preferred alternative the selected remedy, however, provides the best balance of the remedy selection criteria, and available cleanup options for remediating site wastes are limited.  See Section 10.6 for changes in selected remedy made to address public comment.

## 9.0  Selected Remedy

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected a remedy for this site.  The selected cleanup alternative to reduce risks posed by contamination found at the Mathis Brothers Site is Alternative 5, On-Site Incineration/Disposal, On-Site Biotreatment/Disposal and Interceptor Trench/Off-Site Treatment Disposal.  This alternative consists of surface water diversion, waste and soil excavation, on-site incineration and bioremediation, clay cap, installation of interceptor trenches, and institutional controls. Based on current information, this alternative would provide the best balance of trade-offs with respect to the nine evaluation criteria EPA uses to compare cleanup alternatives. The total cost of this alternative is estimated at $12,980,000. EPA believes this remedy will be fully protective of human health and the environment, will attain Federal and state standards or meet requirements for variances from them, and will utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

A. Source Control

Source control remediation will address the waste material, contaminated soils and contaminated sediments at the site. The major components of source control to be implemented include:

- Diversion of surface water;
- Excavation of waste and soil (analysis of carpet and latex waste for determination of appropriate disposal options);
- On-site incineration and disposal of chemical wastes and associated contaminated landfill soil;
- Treatability Studies to determine the effectiveness of biodegradation (an innovative technology with which microorganisms are used to break down contaminants) of contaminated subsurface soil; if successful, implementation of biodegradation with on-site disposal of treated soil;
- A RCRA Solid Waste clay cap would be placed over treated material;
- Installation of interceptor trench for groundwater collection with on-site storage and off-site treatment and disposal;
- Combined institutional control activities.
- If biodegradation is unsuccessful in treating contaminated subsurface soils EPA will consider other remedial alternatives and amend the ROD if necessary.

A portable incinerator will be used on- site to treat the excavated waste material and associated soils. A pilot study will be conducted on the subsurface soils to see if, in EPA's judgement, bioremediation is feasible. If the bioremediation is successful then it will be used to treat the subsurface soils to appropriate established levels.

Performance Standards

Certain performance standards will not be determined until the Remedial Design Phase. The performance standards for this component of the selected remedy include, but are not limited to, the following standards:

Excavation Standards

Excavation shall continue until the remaining soil and material achieve the levels outlined in Table 11 of this document. All excavation shall comply with ARARs, and state standards. Testing methods approved by EPA shall be used to determine if the cleanup levels have been achieved.

Treatment Standards

All treatment and disposal shall comply with applicable or relevant and appropriate requirements (ARARs), including, but not limited to RCRA.  RCRA requires that incineration destroy 99.99 % of the contaminants.

B.  Groundwater remediation

Groundwater remediation will address the contaminated groundwater at the site. Groundwater remediation will include installation of interceptor trenches for groundwater collection with on-site storage and off-site treatment and disposal.

Treatment Standards

Groundwater shall be treated until the concentration levels listed on Table 10 are attained at the wells designated by EPA as compliance points.

C.  Compliance Monitoring

Groundwater, treated soils and surface water monitoring shall be conducted at this site.  After demonstration of compliance with Performance and Treatment Standards, the Site including soil and groundwater, shall be monitored for five years.  If monitoring of groundwater indicates that the Performance Standards are being exceeded at any time after pumping has been discontinued, extraction and off-site treatment and disposal of the groundwater will recommence until the Standards are once again achieved.  If monitoring of the treated soil indicates Performance Standards have been exceeded, the effectiveness of the source control component will be re-evaluated.

**10.0  Statutory Determination**

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment.  In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences.  These specify that, when complete, the selected remedy must meet appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified.  The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.  Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.  The following sections discuss how the selected remedy meets these statutory requirements.

10.1  Protection of Human Health and the Environment

The selected remedy protects human health and the environment through treatment and disposal of the contaminated media at the site.  The selected remedy provides protection of human health and the environment by eliminating, reducing, and controlling risk through treatment, engineering controls and/or institutional controls.

10.2  Attainment of the Applicable or Relevant and Appropriate Requirements (ARARs)

Remedial actions performed under CERCLA, as amended by SARA, must comply with all applicable or relevant and appropriate requirements (ARARs) unless a waiver is justified.  All alternatives considered for the site were evaluated on the basis of the degree to which they complied with these requirements. The selected alternative was found to attain ARARs.

When ARARs are not available for specific compounds or exposure media (such as groundwater), the cleanup goals are based on non-promulgated advisories or guidance such as proposed federal MCLGs, lifetime Health Advisories (Has), and reference dose (RfD) based guidelines.

Federal chemical-specific ARARs for the Mathis Brothers site include the following:

Resource Conservation and Recovery Act (RCRA) Identification and Listing of Hazardous Waste requirements - Defines those solid wastes that are subject to and regulated as hazardous waste. 40 CFR 261, Subparts C and D

RCRA Maximum Concentration Limits requirements - Standards for 14 hazardous constituents as a part of RCRA groundwater protection standards. 40 CFR 264.94

RCRA Treatment Standards - Treatment standards for hazardous wastes or hazardous waste extracts before land disposal is allowed. 40 CFR 268, Subpart D

Safe Drinking Water Act (SDWA) Maximum Contaminant Limits (MCLs) Standards for select organic compounds, minerals, or metals that are enforceable standards for public drinking water systems. 40 CFR 141 and 143

Clean Water Act (CWA) Ambient Water Quality Criteria requirements  Suggested ambient standards for the protection of human health and aquatic life. Presented in CERCLA Compliance Manual, 33 USC 300

CWA Toxic Pollutant Effluent Standards - Establishes effluent standards or prohibitions for certain toxic pollutants:  aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, PCBs.  40 CFR 129

Clean Air Act (CAA) National Emission Standards for Hazardous Air Pollutants - Standards for specific constituents from specific point sources. 40 CFR 61

State chemical-specific ARARs for the Mathis Brothers Site include the following:

Georgia Water Quality Control Act Rules and Regulations for Water Quality Control - State-mandated ambient water-quality standards with respect to state-wide surface waters and effluent discharge standards.  Act No. 870, Chapter 391-3-6

Georgia Safe Drinking Water Act of 1977 Rules for Safe Drinking Water - State standards that set contaminant levels and treatment techniques to satisfy the requirements of 42 USC 300 for public water systems.  Act No. 231, Chapter 391-3-5

Georgia Hazardous Waste Management Act Hazardous Waste Management Establishes standards for generators of hazardous waste.  Act No. 231, Chapter 391-3-5

Georgia Air Quality Control Act Rules for Air Quality Control Establishes ambient air quality standards and point source emission standards. Act No. 794, Chapter 391-3-1

Federal action-specific ARARs for the Mathis Brothers Site include the following:

Guidelines for the Thermal Processing of Solid Wastes - Establishes guidelines applicable to thermal processing (incinerators) facilities designed to process 50 tons or more of municipal solid wastes.  40 CFR 240

Guidelines for the Land Disposal of Solid Wastes - Establishes minimum guidelines applicable to land disposal facilities receiving nonhazardous solid wastes, including siting, access, design, and operating conditions. 40 CFR 241

Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste - Establishes guidelines for the collection of residential, commercial, and institutional solid wastes, including guidelines on the types of containers and collection frequency. 40 CFR 243

Criteria for Classification of Solid Waste Disposal Facilities and Practices - Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment. 40 CFR 257

Criteria for Municipal Solid Waste Landfills - Establishes minimum national criteria for municipal solid waste landfills to ensure protection for human health and the environment, including siting restrictions, monitoring, corrective motions, and post-closure care. 40 CFR 258

RCRA Hazardous Waste Management Systems General - Establishes procedures and criteria for modification or revocation of any provision in 40 CFR 260-265. 40 CFR 260

RCRA Standards Applicable to Generators of Hazardous Waste Establishes standards for generators of hazardous waste. 40 CFR 262

RCRA Standards Applicable to Transporters of Hazardous Waste Establishes standards which apply to persons transporting hazardous waste within the U.S. if the transportation requires manifest under 40 CFR 262. 40 CFR 263

RCRA (Subparts B-O and Subpart X) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste. 40 CFR 264

RCRA Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities - Establishes requirements which apply to recyclable materials that are reclaimed to recover economically significant amounts of precious metals, including gold and silver. 40 CFR 267

RCRA Land Disposal - Establishes a timetable for restriction of burial of wastes and hazardous materials. 40 CFR 268

Underground Storage Tanks - Establishes regulations related to underground storage tanks. 40 CFR 280

SDWA National Primary Drinking Water Regulations - Specifies sampling, analytical, and monitoring requirements. 40 CFR 141

SDWA Underground Injection Control Regulations - Provides for protection of underground sources of drinking water. 40 CFR 144-147

CWA National Pollutant Discharge Eliminating System (NPDES) Requires permits for the discharge of pollutants from any point source into waters of the United States. 40 CFR 125

CWA National Pretreatment Standards - Sets standards to control pollutants which pass through or interfere with treatment processes in publicly owned treatment works or which may contaminate sewage sludge. 40 CFR Part 403

CAA Standards of Performance for Incinerators - Sets performance standards and test methods for evaluation of performance. 40 CFR 60 Subpart E

CAA National Emission Standards for Hazardous Air Pollutants Stipulates monitoring requirements for emissions of specific contaminants. 40 CFR 61

Hazardous Materials Transportation Act (HMTA) Hazardous Material Transportation Regulations - Regulates transportation of hazardous materials. 49CFR 107, 171-177

Comprehensive Response, Compensation and Liability Act of 1980, As Amended (CERCLA) - Establishes funding and enforcement authority for a comprehensive response program for past hazardous waste activities that cause or may cause significant negative impacts on human health and/or the environment. 42 USC 9601

National Contingency Plan (NCP) - Procedures for site removal and remediations; requires that all response actions will be in accordance with the NCP "to the greatest extent possible." 40 CFR 300

State action-specific ARARs for the Mathis Brothers Site include the following:

Georgia Water Quality Control Act Waste Treatment and Permit Requirements - Establishes treatment standards and permitting requirements. Act No. 870, Chapter 391-3-6.06

Georgia Water Quality Control Act Pretreatment and Permit Requirements - Establishes treatment standards and permitting requirements. Act No. 870, Chapter 391-3-6.08

Georgia Water Quality Control Act Publicly Owned Treatment Works Pretreatment Programs - Establishes treatment standards and permitting requirements. Act No. 870, Chapter 391-3-6.09

Georgia Water Quality Control Act Land Disposal and Permit Requirements - Establishes permit requirements, hydraulic loading rates, treatment specifications, and monitoring requirements for land disposal of pollutants. Act No. 870, Chapter 391-3-6.11

Georgia Water Quality Control Act Underground Injection Control Establishes criteria and standards for injection wells. Act No. 870, Chapter 391-3-6.13

Georgia SDWA Rules for Safe Drinking Water - Sets sampling, analytical testing and monitoring frequency requirements for evaluation of drinking water quality. Act No. 870, Chapter 391-3-5

Georgia Hazardous Waste Management Act - Establishes minimum state standards which define the acceptable management of hazardous wastes for owners and operators of facilities which treat, store, dispose of hazardous wastes. Act No. 1251, Chapter 391-3-11

Georgia Air Quality Control Act Rules for Air Quality Control Establishes sampling and monitoring requirements for emissions of specific contaminants. Act No. 794, Chapter 391-3-1

Georgia Solid Waste Management Act - Establishes minimum state standards which define the acceptable management of solid waste for owners and operators of facilities which treat, store, or dispose of solid waste. Act No. 794, Chapter 391-3-4

Georgia Groundwater Use Act - Establishes procedures to be followed to obtain a permit to withdraw, obtain, or use groundwater and for the submission of information concerning the amount of groundwater withdrawal, its intended use, and proposed aquifers. Act No. 794, Chapter 391-3-4

Georgia Hazardous Site Response Act - Requires that after July 1, 1993 all persons who own property where hazardous substances were disposed or released include notice that the property is contaminated in any instrument granting an interest in the property. The owner must also file an affidavit, that will be recorded in the deed records, indicating that the property is contaminated and describing the contaminants with the superior court of the county in which the property lies.

10.3 Cost Effectiveness

The estimated cost of EPA's selected remedy is $12,980,000. Cost effectiveness is determined by comparing the cost of all alternatives being considered with their overall effectiveness to determine whether the costs are proportional to the effectiveness achieved. EPA evaluates the incremental cost of each alternative as compared to the increased effectiveness of the remedy. The selected remedy, Alternative #5 does cost more than the other alternatives. However, effectiveness achieved by Alternative #5 justifies the higher cost. the remedy is considered cost effective.

10.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

EPA has determined that the selected remedy provides the best balance among the nine evaluation criteria for the alternatives evaluated. the selected combination provides protection of human health and the environment, reduces the mobility of the contaminants, and is cost effective. The remedy, when complete, will provide a high degree of permanence. The remedy represents the maximum extent to which permanent solutions and treatment can be practicably utilized to remediate the Mathis Brothers Site.

10.5 Preference for Treatment as a Principal Element

The statutory preference for treatment will be met because the selected remedy treats the contaminated media through incineration and bioremediation.

10.6 Documentation of Significant Changes

EPA issued a Proposed Plan (preferred alternative) for remediation of the Mathis Brothers/South Marble Top Road Landfill Superfund Site on July 30, 1992. The selected remedy differs slightly from the Proposed Plan.

The volume estimate and the cost for Alternative 4 and Alternative 5 have changed slightly from when the proposed plan was issued in July 1992. The volume changed from 140,000 $yd^3$ subsurface soils to 97,700 $yd^3$ subsurface soils and 108,800 $yd^3$ of soils and waste combined. The cost of Alternative 4 went from $11,900,000 to $9,675,000 and the cost of Alternative 5 went from $17,500,000 to $12,980,000.

Also, the cleanup levels found in Table 10 and 11 changed. The reasons for these changes are outlined in the following paragraphs.

The groundwater cleanup level found on Table 10 for silver changed from 50 ug/l to 100 ug/l, styrene changed from 10 to 100 ug/l, toluene changed from 2000 ug/l to 1000 ug/l and 1,2,4-Trichlorobenzene changed from 9 to 70 ug/l. The National Primary Drinking Water Standard (NPDWS) value for silver was delisted from the drinking water standards list July 17, 1992, around the time the Proposed Plan was being completed. There is no longer an MCLG for silver but the secondary MCL (sMCL) for silver is .1 mg/l or 100 ug/l. This is the number that will be used for the cleanup level for silver. The values for styrene and toluene were typographical errors and they have been corrected. The value for 1,2,4-Trichlorobenzene was an error. An MCLG exists for 1,2,4Trichlorobenzene and should have been used. The MCLG is 70 ug/l.

The soil action level found on Table 11 for benzene changed from 0.002 to 0.014 mg/kg, Bis(2-ethylhexyl) Phthalate changed from 4200 for total to 40,440 mg/kg for Bis(2-ethylhexyl) Phthalate, 1,4-Dichlorobenzene changed from 3 to 0.430 and Dicamba changed from 10 to 1,532 mg/kg. EPA received comments from the public during the public comment period that questioned EPA's soil cleanup numbers. EPA rechecked our soil cleanup numbers at that time and realized that they were incorrect and needed recalculation. This recalculation was based on 3 components: (1) The PRP commented during the public comment period that they thought the organic matter content that was used was wrong. After analytical data was provided to EPA to support the organic matter content found in the Remedial Investigation (RI) Report Appendices, it was used in lieu of the original conservative number that EPA had used because of lack of sufficient data; (2) EPA had used an outdated MCL instead of a more recent superseding MCL; and (3) In checking these numbers as a result of receiving comments from the public, EPA rechecked all of the numbers used to calculate cleanup levels and found that a partitioning coefficient was incorrect and therefore had to be changed. The original came from Shaver's Farm information but the GWTSU found a data source that was more reliable than the source that was originally used for a partitioning coefficient. After changes were made to the cleanup levels based on the above mentioned information, the volume estimate was checked again to see if the cleanup level changes impacted the volume. They did not impact the volume; the volume remained at 108,800 yd[3]. There was therefore no significant change.

The proposed plan did not contain soil cleanup levels for metals. It stated that soil cleanup values for metals would be included in the ROD as soon as they were determined. Since the time that the proposed plan was issued EPA determined that there is no statistical difference between the metals levels found in background soil and those found in site soil samples. Therefore, there is no need for soil cleanup levels for metals in soils.

In the proposed plan a contingency remedy of incineration was included, in Alternative 5, in the event that bioremediation failed. This has been deleted in light of comments received by EPA. In the event that bioremediation fails incineration remains an option that may be considered during a future evaluation of alternative contingencies for subsurface soils. Future developed technologies could also be considered in that evaluation.

APPENDIX A

Georgia Department of Natural Resources
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Joe D. Tanner, Commissioner
Harold F. Reheis, Director
Environmental Protection Division

March 23, 1993

Mr. Richard D. Green
Associate Director, Superfund and Emergency Response
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Revised Draft Record of Decision
For Mathis Brothers/South
Marble Top Road
Walker County, Georgia

Dear Mr. Green:

The Georgia Environmental Protection Division has reviewed the above referenced document and concurs with the Record of Decision, and the Environmental Protection Agency's selected remedial action for the Mathis Brothers/South Marble Top Road Landfill site.

If we can be of further assistance to you, please contact Bill Mundy at (404) 656-7802.

Sincerely,

Harold F. Reheis
Director

HFR/nwb